

National Semiconductor Corporation)
Cumberland County)
South Portland, Maine)
A-698-71-L-R)

**Departmental
Finding of Fact and Order
Air Emission License**

After review of the air emissions license application, staff investigation reports and other documents in the applicants file in the Bureau of Air Quality, pursuant to 38 M.R.S.A., Section 344 and Section 590, the Department finds the following facts:

I. REGISTRATION

A. Introduction

National Semiconductor Corporation (National Semiconductor) of South Portland, Maine has applied to renew their Air Emission License, permitting the operation of emission sources associated with their silicon wafer manufacturing facility.

B. Emission Equipment

The following equipment is addressed in this license:

Fuel Burning Equipment

Equipment	Maximum Capacity (MMBtu/hr)	Fuel Type	Maximum Firing Rate	Stack #
Boiler #1	29.3	#2 Fuel Oil, 0.5% S	209 gal/hr and	1
		Natural gas	28,446 scf/hr	
Boiler #2	29.3	#2 Fuel Oil, 0.5% S	209 gal/hr and	1
		Natural gas	28,446 scf/hr	
Boiler #3	29.3	#2 Fuel Oil, 0.5% S	209 gal/hr and	1
		Natural gas	28,446 scf/hr	
Boiler #4	29.3	#2 Fuel Oil, 0.5% S	209 gal/hr and	2
		Natural gas	28,446 scf/hr	
Boiler #5	29.3	#2 Fuel Oil, 0.5% S	209 gal/hr and	2
		Natural gas	28,446 scf/hr	
Boiler #7	1.8	Natural gas	1748 scf/hr	4
VOC Abatement Unit	2.0	Natural gas and propane back-up	1941 scf/hr 21.3 gal/hr	3

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Emergency Diesel Generators

<u>Equipment</u>	<u>Maximum Capacity (MMBtu/hr)</u>	<u>Fuel Type, % Sulfur</u>	<u>Maximum Firing Rate (gal/hr)</u>
Generator 1 (Building 1 South)	5.5	diesel, 0.05%	40.2
Generator 2 (Building 4 1500KW)	14.6	diesel, 0.05%	106.7
Generator 3 (Building 4 2000KW)	18.8	diesel, 0.05%	137.4
Generator 4 (Building 1 North)	4.4	diesel, 0.05%	32.0

Process Equipment/Emission Points

The following are the process source vents. Process capacity for the vents are variable since processes are often changed within rooms.

All Located in Building 4:

<u>Process ID</u>	<u>Control Type</u>
SEF 4-1 (acid gas)	Wet Scrubber 1
SEF 4-2 (acid gas)	Wet Scrubber 2
SEF 4-3 (acid gas)	Wet Scrubber 3
SEF 4-4 (acid gas)	Wet Scrubber 4
SEF 4-5 (acid gas)	Wet Scrubber 5
SEF 4-6 (alkali gas)	Wet Scrubber 6
SEF 4-7 (alkali or acid gas)	Wet Scrubber 7
SEF 4-8 (alkali or acid gas)	Wet Scrubber 8
SEF 4-9 (acid gas)	Wet Scrubber 9 Fan 1
SEF 4-10 (acid gas)	Wet Scrubber 9 Fan 2

<u>Process ID</u>	<u>Control Type</u>
EF 4-14 (heat exhaust)	N/A
EF 4-15 (heat exhaust)	N/A
EF 4-16 (heat exhaust)	N/A
EF 4-17 (heat exhaust)	
EF 4-47 (heat exhaust)	N/A
EF 4-48 (heat exhaust)	N/A
EF-51 (Smoke purge emergency ventilation)	N/A
EF-52 (heat exhaust)	N/A
EF-53 (heat exhaust)	N/A

National Semiconductor also has insignificant activities including, but not limited to, storage tanks (fuel oil, diesel, waste solvent, liquid hydrogen, liquid nitrogen, liquid argon) and natural gas-fired burn boxes.

C. Application Classification

The renewal application for National Semiconductor does not include licensing additional equipment. As such, this application has been processed as a minor revision.

II. BEST PRACTICAL TREATMENT (BPT)

A. Introduction

In order to receive a license the applicant must control emissions from each unit to a level considered by the Department to represent best practical treatment (BPT), as defined in Chapter 100 of the Department's regulations. Separate control requirement categories exist for new and existing equipment as well as for those sources located in designated non-attainment areas.

BPT for existing emissions equipment means that method which controls or reduces emissions to the lowest possible level considering:

- the existing state of technology;
- the effectiveness of available alternatives for reducing emissions from the source being considered; and
- the economic feasibility for the type of establishment involved.

B. Process Description

The following is a general process description which is provided to identify where the equipment fits into the process:

National Semiconductor manufactures silicon wafers sized at 8 inches in diameter. Each semiconductor manufactured goes through the same general process steps, but the complexity and structural makeup between the products are slightly different. Oxide and metallic layers are built up on the blank wafers with changes or additions in chemicals or process parameters to build the various layers to the required specifications. The manufacturing processes include repeated batch operation steps such as precleaning, doping, photo mask development, etching, backgrinding, and cleaning.

The wafers are first precleaned with chemicals in cleaning tanks for a specific period of time. After each cleaning tank, the wafers are rinsed with deionized water. Following the precleaning steps, the wafers are sent to diffusion furnaces where the initial layer of oxide is grown on the wafer. Depending on the stage of the oxide layer growth, layer number or product type, the operating parameters vary significantly. The introduction of impurities (doping) may occur in the diffusion chambers if required.

After oxidation, the wafers are placed on the photoresist coating equipment. The wafers are dried, then photoresist (a light sensitive chemical) is applied. The wafer is baked and exposed to a light beam shot through a mask containing the desired network configuration. After exposure, the wafer is developed using a photoresist fixer.

Before etching, some wafers are sent to the ion implanting area. Impurities are deposited into the layer(s) using a high speed particle accelerator. Etching

removes the oxide which was not fixed in the development stage. Either a gas or liquid chemical process is used for this removal. After etching, the remaining photoresist on top of the fixed portion of the wafer is stripped with sulfuric peroxide or carbon tetrafluoride and oxygen.

After the required layers are formed, the wafers are transferred to another room where the back side of the disk is ground down to specifications. In the assembly area, the wafers are cut into individual chips, aluminum contacts are soldered onto the proper junctions, and the chips are enclosed in a ceramic housing. Ultrasonic cleaning is used to remove cleaning fluids and machine oils from the chip frames. After completion of chip assembly, the semiconductor chips are inspected, boxed, and shipped.

C. Boilers 1, 2, 3, 4, and 5

National Semiconductor operates five 29.3 MMBtu/hr Cleaver Brooks package firetube boilers (Boilers 1, 2, 3, 4, and 5). Boilers 1, 2 and 3 were manufactured in 1995, Boiler 4 was manufactured in 1997, and Boilers 5 was manufactured in 2000. The boilers are therefore subject to EPA's New Source Performance Standards, 40 CFR Part 60, Subpart Dc.

These boilers also have the capability of firing 0.5% sulfur #2 fuel oil as a back-up fuel in the event natural gas is not readily available or feasible.

BPT for the boilers is the following:

- Use of natural gas.
- Use of 0.5% sulfur #2 fuel oil in the event natural gas is not available or feasible.
- PM, PM₁₀, SO₂, NO_x, CO and VOC emission rates when firing natural gas are based on manufacturer data.
- SO₂ emission rates when firing #2 fuel oil are based on all of the sulfur in the fuel converting to SO₂ (mass balance).
- PM, PM₁₀, NO_x, CO and VOC emission rates when firing #2 fuel oil are based on manufacturer data.
- When firing natural gas, visible emissions from the stack serving Boilers 1, 2 and 3 (Stack 1) and Boilers 4, and 5 (Stack 2) shall not exceed an opacity of 10 percent on a six (6) minute block average basis, except for no more than two (2) six (6) minute block averages in a 3-hour period.
- When firing fuel oil, visible emissions from the stack serving Boilers 1, 2 and 3 (Stack 1) and Boilers 4 and 5 (Stack 2) shall not exceed an opacity of 20 percent on a six (6) minute block average basis, except for no more than two (2) six (6) minute block averages in a 3-hour period.

C. Boiler 7

Boiler 7 has a heat input capacity of 1.8 MMBtu/hr and is therefore not subject to EPA's New Source Performance Standards, 40 CFR Part 60, Subpart Dc.

BPT for the boiler is the following:

- Use of natural gas.
- PM, PM₁₀, SO₂, NO_x, CO and VOC emission rates when firing natural gas are based on manufacturer data.
- Visible emissions from the stack serving Boiler 7 (Stack 3) shall not exceed an opacity of 10 percent on a six (6) minute block average basis, except for no more than two (2) six (6) minute block averages in a 3-hour period.

E. Definition of "Emergency"

Per MEDEP Chapter 100, the definition of emergency for Chapter 115 purposes is the following:

"... any situation arising from sudden and reasonably unforeseeable events beyond the control of the source, including acts of God, which situation requires immediate corrective action to restore normal operation, and that causes the source to exceed a technology based emission limitation under the license, due to unavoidable increases in emissions attributable to the emergency. An emergency shall not include noncompliance to the extent caused by improperly designed equipment, lack of preventative maintenance, careless or improper operation, or operator error."

Therefore, by definition, a diesel used for load shedding purposes (also known as a "Dispatchable Load Generators") is not considered an "Emergency Generator".

F. Emergency Diesel Units

National Semiconductor has four emergency diesel generators (Units 1, 2, 3, 4).

BPT for the emergency generators is the following:

1. Emission limits for PM and PM₁₀ are regulated by MEDEP Regulations, Chapter 103.
2. MEDEP Chapter 106 regulates fuel sulfur content, however the use of 0.05% sulfur by weight fuel is more stringent and shall be used.
3. SO₂ emission rates are based on all of the sulfur in the fuel converting to SO₂ (mass balance).
4. NO_x, CO and VOC emission rates were based on manufacturer data.
5. Operational limit of 500 hours per year.
6. Opacity from the diesel engines shall not exceed 20% on a six (6) minute block average basis, except for two (2) six (6) minute block averages in a 3-hour period.

G. VOC Processes and Abatement Unit

National Semiconductor has various process operations that emit VOCs. Due to product specifications and manufacturing needs, the amount of VOCs emitted from a specific vent can vary. However, National Semiconductor has installed a VOC abatement unit to control VOCs from tools. These are labeled “PEV” or “Process Exhaust-Volatile”.

The VOC abatement unit consists of a zeolite concentrator followed by an incinerator unit with a 2 MMBtu/hr natural gas burner (propane back-up). The unit is exhausted through its own stack. The unit shall be maintained and operated to meet a minimum treatment efficiency of 90% removal. The removal efficiency shall be calculated as follows:

$$\frac{(VOCs \text{ at inlet of abatement unit}) - (VOCs \text{ at outlet of abatement unit})}{(VOCs \text{ at inlet of abatement unit})} \times 100$$

Testing shall be performed annually (by May 31 of each year).

The following parameters shall be monitored on the unit:

- 1) combustion temperature;
- 2) alarms that indicate the status of the concentrator's rotor; and
- 3) the status of the fans located in the process vents.

The unit is designed to run within a temperature range of 1360°F-1500°F. When the monitored temperature goes above 1500°F or below 1360°F, the unit shuts down. National Semiconductor shall keep records of events when the unit shuts down and events when the alarms are activated. The records shall include the time the unit is not operating. These records shall be incorporated into the emissions calculations since the VOCs vent to the atmosphere when the unit is not operating. National Semiconductor shall operate the VOC abatement unit at all times the wafer process is in operation, except for malfunctions. The VOC abatement unit shall have a 97% uptime when the wafer process is in operation.

All of the non-insignificant VOCs from building 4 are collected and incinerated in the VOC incinerator. National Semiconductor shall use the portion of Building 2 which is not leased to Fairchild for warehouse-type activities.

National Semiconductor shall be limited to 25 tons/year of VOCs on a 12 month rolling total basis. National Semiconductor uses an accounting calendar consisting of four quarters, each with two four week financial periods and one five week financial period. In order to show compliance, National Semiconductor shall use its records on issuing solvents from the stockroom to the factory, and control efficiencies to calculate emissions. National will separately keep records for those solvents issued to process with emission control and those issued for uncontrolled processes.

Because most spent solvents are collected with water at the manufacturing tool, National Semiconductor is not able to measure the amount of spent solvent collected. Therefore an alternate method was developed for calculating VOC emissions. For each financial period during the year, National Semiconductor shall compute emissions for the previous 12 financial periods. The emissions shall be estimated in accordance with the following equations:

Hourly rate

HR = average VOC emission rate measured during VOC testing, (lbs VOC/hour)

When the VOC abatement unit is not operating, the emissions from the normally controlled area shall be considered uncontrolled in the VOC emission calculations. For this period, the uncontrolled hourly rate will be used.

Period Hours

PH = 672 hours per four week period or 840 hours per five week period

Period Rate

$PR = HR \times PH$ lbs VOC emitted/period

Period process solvents issued from storeroom to factory

PS (lbs VOCs issued/period)

Emission rate

$ER = \frac{PR}{PS}$ (lb VOC emitted/lb VOC issued)

Annual process emission rate

$PAR = \sum_{n=1}^{n=12} (PS \times ER)_1 + \dots + (PS \times ER)_{12}$ for the 12 periods in a year (lbs/year)

Uncontrolled annual rate

$UAR = \sum_{n=1}^{n=12} \text{Uncontrolled VOCs Emitted}$ for the 12 periods in a year (lbs/year)

Total annual rate

$TAR = PAR + UAR$, (lbs/year)

$TAR = (PAR + UAR)/2000$ (tons per year)

For VOCs from insignificant activities, National Semiconductor shall maintain in its files an estimate of the VOCs emitted annually from such activities, to the extent that the VOC emissions are not included in the 12 month rolling average recordkeeping program. The estimate shall be updated annually if process or raw material changes have occurred that would effect the previous estimate.

BPT for the VOCs emitted from the processes at National Semiconductor shall be a limit of 25 tons/year, based on a 12 month rolling total. Visible emissions from the VOC abatement unit shall be limited to 10% opacity on a six-minute average

basis, except for no more than one six minute average in any one-hour period. Visible emissions from VOC venting directly to the atmosphere shall not exceed 10% opacity.

H. Acid and Alkaline Scrubbers

National Semiconductor has several acid and alkaline emission points. These are controlled by alkaline and acidic wet scrubbers. The pH of the alkali scrubber shall be used as a control parameter and monitored and adjusted as appropriate. The pH of alkaline gas scrubbing media shall be maintained at or below 7. The pH of the alkali scrubber shall be checked and recorded once per shift. National Semiconductor may use either the effluent from the acid scrubbers and/or an addition of sulfuric acid to control the pH in the alkali scrubber.

The continuous flow of water shall be used as a control parameter in the acid scrubber. The flow shall be maintained at the manufacturers recommended flow and shall be checked and recorded once per shift.

BPT for the acid and alkaline emission points is the use of wet scrubbers. Opacity from each scrubber stack shall not exceed 10% opacity on a six minute average basis, except for no more than one six minute average in any one hour period.

I. HAP (Hazardous Air Pollutant) Processes

Some of the VOCs emitted by National Semiconductor contain HAPs ("HAPs" means those substances listed in Section 112(b) of the Clean Air Act). In order to meet BPT and keep the facility under the major source thresholds, National Semiconductor shall be limited to emissions of 9.9 tons/year of any single HAP and less than 24.9 tons/year total of all HAPs. Recordkeeping shall be done on a monthly basis documenting compliance with these 12 month rolling total limits.

The monthly recordkeeping for HAPs may be directly correlated to the VOC recordkeeping and the formula given above for VOC emission calculations. National Semiconductor shall keep a 12 month rolling total for each HAP emitted and total facility HAPs emitted based on purchase records, MSDS (material safety data sheets) records for the various materials used in the facility, and whether the HAP is controlled before being emitted to the atmosphere.

Emissions from the acid and alkaline scrubbers include water vapor and a small amount of acid or base. These non-water vapor emissions are reported as part of National Semiconductor's HAP report. Emission rates are based on previous stack testing.

J. Annual Emissions

To maximize operational flexibility and National Semiconductor's ability to respond to changes in fuel market conditions and to ensure that the South Portland

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plant remains below the 40 CFR Part 70 major source threshold, National Semiconductor shall be limited facility-wide to 99.9 TPY of PM, SO₂, NO_x, and CO using the fuel equations below. Based on the short term emission limits, if SO₂, NO_x, and CO are under 99.9 tons/year, PM is also under 99.9 tons/year. National Semiconductor shall use #2 fuel oil (0.5% sulfur) and natural gas in its boilers and fuel oil in its emergency generators. VOCs from fuel burning sources shall be limited to 25 tons/year and VOCs from process sources shall be limited to 20 tons/year.

The following shall not be exceeded on a 12 month rolling total:

Total Allowable Annual Emissions for the Facility
(used to calculate the annual license fee)

Pollutant	Tons/year
PM	99.9
PM ₁₀	99.9
SO ₂	99.9
NO _x	99.9
CO	99.9
VOC	25 process equip 20 fuel burning
Single HAP	9.9
Total HAP	24.9

III. AMBIENT AIR QUALITY ANALYSIS

According to the Maine Regulations Chapter 115, the level of air quality analyses required for a renewal source shall be determined on a case-by case basis. Modeling was performed as part of amendment A-698-71-D-M, therefore further modeling is not required at this time.

ORDER

Based on the above Findings and subject to conditions listed below the Department concludes that the emissions from this source:

- will receive Best Practical Treatment,
- will not violate applicable emission standards, and
- will not violate applicable ambient air quality standards, or increment standards either alone or in conjunction with emissions from other sources.

Therefore the Department grants air emission license A-698-71-L-R, subject to the following conditions:

- (1) Employees and authorized representatives of the Department shall be allowed access to the licensee's premises during business hours, or any time during which any emissions units are in operation, and at such other times as the Department deems necessary for the purpose of performing tests, collecting samples, conducting inspections, or examining and copying records relating to emissions. (Title 38 MRSA §347-C)
- (2) The licensee shall acquire a new or amended air emission license prior to commencing construction of a modification, unless specifically provided for in Chapter 115.
- (3) Approval to construct shall become invalid if the source has not commenced construction within eighteen (18) months after receipt of such approval or if construction is discontinued for a period of eighteen (18) months or more. The Department may extend this time period upon a satisfactory showing that an extension is justified, but may condition such extension upon a review of either the control technology analysis or the ambient air quality standards analysis, or both.
- (4) The licensee shall establish and maintain a continuing program of best management practices for suppression of fugitive particulate matter during any period of construction, reconstruction, or operation which may result in fugitive dust, and shall submit a description of the program to the Department upon request.
- (5) The licensee shall pay the annual air emission license fee to the Department, calculated pursuant to Title 38 MRSA §353.

- (6) The license does not convey any property rights of any sort, or any exclusive privilege.
- (7) The licensee shall maintain and operate all emission units and air pollution control systems required by the air emission license in a manner consistent with good air pollution control practice for minimizing emissions.
- (8) The licensee shall maintain sufficient records, to accurately document compliance with emission standards and license conditions and shall maintain such records for a minimum of six (6) years. The records shall be submitted to the Department upon written request.
- (9) The licensee shall comply with all terms and conditions of the air emission license. The filing of an appeal by the licensee, the notification of planned changes or anticipated noncompliance by the licensee, or the filing of an application by the licensee for the renewal of a license or amendment shall not stay any condition of the license.
- (10) The licensee may not use as a defense in an enforcement action that the disruption, cessation, or reduction of licensed operations would have been necessary in order to maintain compliance with the conditions of the air emission license.
- (11) In accordance with the Department's air emission compliance test protocol and 40 CFR Part 60 or other method approved or required by the Department, the licensee shall:
 - (i) perform stack testing to demonstrate compliance with the applicable emission standards under circumstances representative of the facility's normal process and operating conditions:
 - a. within sixty (60) calendar days of receipt of a notification to test from the Department or EPA, if visible emissions, equipment operating parameters, staff inspection, air monitoring or other cause indicate to the Department that equipment may be operating out of compliance with emission standards or license conditions; or
 - b. pursuant to any other requirement of this license to perform stack testing.
 - (ii) install or make provisions to install test ports that meet the criteria of 40 CFR Part 60, Appendix A, and test platforms, if necessary, and other accommodations necessary to allow emission testing; and

- (iii) submit a written report to the Department within thirty (30) days from date of test completion.
- (12) If the results of a stack test performed under circumstances representative of the facility's normal process and operating conditions indicate emissions in excess of the applicable standards, then:
- (i) within thirty (30) days following receipt of such test results, the licensee shall re-test the non-complying emission source under circumstances representative of the facility's normal process and operating conditions and in accordance with the Department's air emission compliance test protocol and 40 CFR Part 60 or other method approved or required by the Department; and
 - (ii) the days of violation shall be presumed to include the date of stack test and each and every day of operation thereafter until compliance is demonstrated under normal and representative process and operating conditions, except to the extent that the facility can prove to the satisfaction of the Department that there were intervening days during which no violation occurred or that the violation was not continuing in nature; and
 - (iii) the licensee may, upon the approval of the Department following the successful demonstration of compliance at alternative load conditions, operate under such alternative load conditions on an interim basis prior to a demonstration of compliance under normal and representative process and operating conditions.
- (13) Notwithstanding any other provision in the State Implementation Plan approved by the EPA or Section 114(a) of the CAA, any credible evidence may be used for the purpose of establishing whether a person has violated or is in violation of any statute, regulation, or Part 70 license requirement.
- (14) The licensee shall maintain records of malfunctions, failures, downtime, and any other similar change in operation of air pollution control systems or the emissions unit itself that would affect emissions and that is not consistent with the terms and conditions of the air emission license. The licensee shall notify the Department within two (2) days or the next state working day, whichever is later, of such occasions where such changes result in an increase of emissions. The licensee shall report all excess emissions in the units of the applicable emission limitation.
- (15) Upon written request of the Department, the licensee shall establish and maintain such records, make such reports, install, use and maintain such monitoring equipment, sample such emissions (in accordance with such methods, at such locations, at such intervals, and in such manner as the Department shall prescribe), and provide other information as the Department may reasonably require to determine the licensee's compliance status.

(16) Boilers 1, 2, 3, 4, and 5

A. Boilers 1, 2, 3, 4, and 5 shall each be limited to the following emission rates:

**Boilers 1, 2, 3, 4, and 5 Emission Limits
when firing natural gas (each)**

<u>Pollutant</u>	<u>lb/MMBtu</u>	<u>lb/hr</u>
PM	0.04	1.07
PM ₁₀	n/a	1.07
SO ₂	n/a	0.03
NO _x	0.035	1.03
CO	n/a	1.07
VOC	n/a	0.47

**Boilers 1, 2, 3, 4, and 5 Emission Limits
when firing 0.5% sulfur #2 fuel oil (each)**

<u>Pollutant</u>	<u>lb/MMBtu</u>	<u>lb/hr</u>
PM	0.07	2.05
PM ₁₀	n/a	2.05
SO ₂	n/a	14.75
NO _x	0.185	5.43
CO	n/a	2.05
VOC	n/a	0.88

- B. Boilers 1, 2, 3, 4, and 5 shall fire #2 fuel oil with a maximum sulfur content of 0.5% or natural gas.
- C. National Semiconductor shall follow all applicable NSPS, 40 CFR Part 60, Subpart Dc requirements for boilers 1, 2, 3, 4, and 5.
- D. National Semiconductor shall maintain a log of monthly fuel use records. Fuel receipts from the supplier shall be kept to certify the sulfur content of the oil. Fuel use records shall be kept for a minimum of 6 years.
- E. Visible emissions from Stack 1 (Boilers 1, 2 and 3 common stack) and Stack 2 (Boilers 4 and 5 common stack) shall not exceed an opacity of 10 percent on a six (6) minute block average basis, except for no more than two (2) six (6) minute block averages in a 3-hour period.

(17) Boiler 7

A. Boiler 7 shall be limited to the following emission rates:

Boiler 7 Emission Limits

<u>Pollutant</u>	<u>lb/hr</u>
PM	0.02
PM ₁₀	0.02
SO ₂	0.01
NO _x	0.13
CO	0.30
VOC	0.04

B. Boilers 7 shall fire only natural gas.

C. National Semiconductor shall maintain a log of monthly fuel use records. Fuel use records shall be kept for a minimum of 6 years.

D. Visible emissions Boiler 7 (Stack 4) shall not exceed an opacity of 10 percent on a six (6) minute block average basis, except for no more than one (1) six (6) minute block average in a 3-hour period.

(18) Emergency Diesel Units

A. Emissions from Generator 1 (Building 1 South) shall not exceed the following:

<u>Pollutant</u>	<u>lb/MMBtu</u>	<u>lb/hr</u>
PM	0.12	0.66
PM ₁₀	n/a	0.66
SO ₂	n/a	0.28
NO _x	n/a	14.57
CO	n/a	0.55
VOC	n/a	0.06

B. Emissions from Generator 2 (Building 4 1500 KW) shall not exceed the following:

<u>Pollutant</u>	<u>lb/MMBtu</u>	<u>lb/hr</u>
PM	0.10	1.46
PM ₁₀	n/a	1.46
SO ₂	n/a	0.75
NO _x	n/a	59.57
CO	n/a	5.57
VOC	n/a	0.74

- C. Emissions from Generator 3 (Building 4 2000 kW) shall not exceed the following:

<u>Pollutant</u>	<u>lb/MMBtu</u>	<u>lb/hr</u>
PM	0.10	1.88
PM ₁₀	n/a	1.88
SO ₂	n/a	0.96
NO _x	n/a	72.40
CO	n/a	5.26
VOC	n/a	1.09

- D. Emissions from Generator 4 (Building 1 North) shall not exceed the following:

<u>Pollutant</u>	<u>lb/MMBtu</u>	<u>lb/hr</u>
PM	0.10	0.44
PM ₁₀	n/a	0.44
SO ₂	n/a	0.23
NO _x	n/a	22.30
CO	n/a	10.60
VOC	n/a	0.05

- E. Generator 1, 2, 3 and 4 each shall be limited to 500 hours per year of operation, based on a 12 month rolling total. An hour meter shall be maintained and operated on each emergency diesel generator.
- F. The sulfur content of the fuel shall be less than or equal to 0.05% by weight, demonstrated by fuel receipts from the supplier.
- G. A log documenting the dates, times and reasons for operation for each generator shall be kept.
- H. Visible emissions from each emergency generator shall not exceed 30% opacity on a six (6) minute block average basis, except for two (2) six (6) minute block averages in a 3-hour period.
- I. Generators 1, 2, 3 and 4 may be operated periodically for test purposes, planned utility maintenance power outages and during emergencies (as defined in Chapter 100 of the Department's regulations). National Semiconductor shall not operate Generators 1, 2, 3 or 4 as Dispatchable Load Generators (load shedding).

(19) VOC Processes and Abatement Unit

- A. Facility-wide process VOC emissions shall be limited to 25 tons/year, based on a 12 month rolling total.

- B. National Semiconductor shall maintain and operate the VOC abatement unit which controls VOC emission from the tool solvent vents. These shall be labeled “PEV” or “process Exhaust – Volatile”. The unit shall be maintained and operated to meet a minimum treatment efficiency of 90% removal. The removal efficiency shall be calculated as follows:

$$\frac{(VOCs \text{ at inlet of abatement unit}) - (VOCs \text{ at outlet of abatement unit})}{(VOCs \text{ at inlet of abatement unit})} \times 100$$

- C. Testing shall be performed by **May 31** of each year on the inlet and outlet streams of the VOC abatement unit. Testing shall be conducted in accordance with the appropriate EPA method.
- D. The following shall be monitored on the VOC abatement unit:
1. combustion temperature (parameter monitor),
 2. alarms that indicate the status of the concentrator's rotor,
 3. the status of the fans located in the process vents.

The combustion temperature parameter monitor must record accurate and reliable data. If the parameter monitor is recording accurate and reliable data less than 98% of the VOC abatement unit-operating time within any quarter of the calendar year, the Department may initiate enforcement action and may include in that enforcement action any period of time that the parameter monitor was not recording accurate and reliable data during that quarter unless the licensee can demonstrate to the satisfaction of the Department that the failure of the system to record accurate and reliable data was due to the performance of established quality assurance and quality control procedures or unavoidable malfunctions.

- E. National Semiconductor shall keep records of events when the unit shuts down, including the automatic shutoff when the unit is not in the normal operating range (1360°F-1500°F) and events when the alarms are activated. The records shall include the time that the unit is not operating.
- F. National Semiconductor shall operate the VOC abatement unit at all times the wafer process is in operation, except for malfunctions. The VOC abatement unit shall have a 97% uptime when the wafer process is in operation.
- G. Visible emissions from the VOC abatement unit shall not exceed 10% opacity on a six-minute average basis, except for no more than one six minute average in any one-hour period.
- H. Visible emissions from vents emitting VOCs directly to the atmosphere shall not exceed 10% opacity.

- I. Total VOC emissions from the processes at National Semiconductor shall be calculated on a 12 month rolling total, updated monthly, using the following equations:

Hourly rate

HR = average VOC emission rate measured during VOC testing, (lbs VOC/hour)

When the VOC abatement unit is not operating, the emissions from the normally controlled area shall be considered uncontrolled in the VOC emission calculations. For this period, the uncontrolled hourly rate will be used.

Period Hours

PH = 672 hours per four week period or 840 hours per five week period

Period Rate

$PR = HR \times PH$ lbs VOC emitted/period

Period process solvents issued from storeroom to factory

PS (lbs VOCs issued/period)

Emission rate

$ER = \frac{PR}{PS}$ (lb VOC emitted/lb VOC issued)

Annual process emission rate

$PAR = \sum_{n=1}^{n=12} (PS \times ER)_1 + \dots + (PS \times ER)_{12}$ for the 12 periods in a year (lbs/year)

Uncontrolled annual rate

$UAR = \sum_{n=1}^{n=12} \text{Uncontrolled VOCs Emitted}$ for the 12 periods in a year (lbs/year)

Total annual rate

$TAR = PAR + UAR$, (lbs/year)

$TAR = (PAR + UAR)/2000$ (tons per year)

When the VOC abatement unit is not operating, the emissions from the normally controlled area shall be considered uncontrolled in the VOC emission calculation.

For VOCs from insignificant activities, National Semiconductor shall maintain in its files an estimate of the VOCs emitted annually from such activities, to the extent that the VOC emissions are not included in the 12 month rolling average recordkeeping program. The estimate shall be updated annually if process or raw material changes have occurred that would effect the previous estimate.

(20) HAP Processes

- A. National Semiconductor shall be limited to 9.9 tons/year of any single HAP and 24.9 tons/year of total facility HAPs, based on a 12 month rolling total.
- B. Recordkeeping shall be performed on a monthly basis documenting compliance with the 12 month rolling limits. The monthly recordkeeping for HAPs may be directly correlated to the VOC recordkeeping and the formula given above for VOC emission calculations. National Semiconductor shall keep a 12 month rolling total for each HAP emitted and total facility HAPs emitted based on purchase records, MSDS records for the various materials used in the facility, and whether the HAP is controlled before being emitted to the atmosphere.

Emissions from the acid and alkaline scrubbers include a small amount of acid or base. These non-water vapor emissions are reported as part of National Semiconductor's HAP report. Emission rates are based on previous stack testing.

(21) Acid Scrubbers

- A. The acid wet scrubbers shall remain labeled for clarification purposes. Water may be used as the scrubbing media in the acid wet scrubbers. The flow of water shall be maintained at the manufacturers recommended flow and shall be checked and recorded once per shift.
- B. National Semiconductor shall test one of the acid scrubbers within 60 days of reaching the following production levels: 15,000 wafers shipped/four week period, 20,000 wafers shipped/four week period, and 30,000 wafers shipped/four week period. If the production level drops to less than 80% of the specified level within 60 days, then testing is not required until the level is hit again. Test results submitted to the Department for each level of production shall include efficiency of the scrubber, including inlet and outlet mass rates and concentrations. Based on the test results, National Semiconductor may be required to add NaOH as part of the scrubbing media in the future.
- C. Opacity from the acid scrubber stack shall not exceed 10% on a six minute average basis, except for no more than one six minute average in any one hour period.

(22) Alkaline Scrubbers

- A. The alkaline wet scrubbers shall remain labeled for clarification purposes. The alkaline wet scrubbers shall be monitored for pH. The pH of alkaline gas scrubbing media shall be maintained at or below 7. The pH of the alkali scrubber shall be checked and recorded once per shift. National

Semiconductor may use either the effluent from the acid scrubbers and/or an addition of sulfuric acid to control the pH in the alkali scrubber.

- B. National Semiconductor shall test one of the alkaline scrubbers within 60 days of reaching the following production levels: 15,000 wafers shipped/four week period, 20,000 wafers shipped/four week period, and 30,000 wafers shipped/four week period. If the production level drops to less than 80% of the specified level within 60 days, then testing is not required until the level is hit again. Test results submitted to the Department for each level of production shall include efficiency of the scrubber, including inlet and outlet mass rates and concentrations, and pH. Based on the test results, the Department may adjust the pH requirement for the alkaline scrubbers.
- C. Opacity from the alkaline scrubber stack shall not exceed 10% on a six minute average basis, except for no more than one six minute average in any one hour period.
- (23) SO₂, NO_x, CO and fuel burning VOC Ton Per Year Limits
- A. From fuel records, the following equations shall be used to determine compliance with the SO₂, NO_x, CO and fuel burning VOC ton per year limits (12-month rolling total). National Semiconductor shall maintain monthly records documenting the 12 month rolling total.

SO₂

$$AD_{SO_2} + \frac{[(0.141)(y)(\bar{S})] + [(0.000001011)(z)]}{2000} \leq 99.99 \text{ tons/year}$$

Where:

AD_{SO₂} = annual quantity (tons) of SO₂ from the operation of all diesel generators = sum of [(total hours of operation) × (lb/hr limit)]/2000 for each unit

y = annual quantity of #2 oil combusted (gallons) facility wide

\bar{S} = average sulfur content by weight of #2 oil (percent)

z = annual quantity of natural gas combusted (cubic feet) facility wide

$$0.141 = \left(\frac{1 \text{ lb } S}{100 \text{ lb } \#2 \text{ fuel}} \right) \left(\frac{2 \text{ lb } SO_2}{1 \text{ lb } S} \right) \left(\frac{7.05 \text{ lb } \#2 \text{ fuel}}{\text{gallon } \#2 \text{ fuel}} \right) (\text{mass balance})$$

$$0.000001011 = 1.011 \text{ lb } S \text{ per MMscf (manufacturer data)}$$

NO_x

$$AD_{NO_x} + \frac{[(0.02594)(y)] + [(0.0000359)(z)]}{2000} \leq 99.99 \text{ tons/year}$$

Where:

AD_{NO_x} = annual quantity (tons) of NO_x from the operation of all diesel generators = sum of [(total hours of operation) × (lb/hr limit)]/2000 for each unit

y = annual quantity of #2 oil combusted (gallons) in boilers

z = annual quantity of natural gas combusted (cubic feet) in boilers

$$0.028 = \left(\frac{0.2 \text{ lb NO}_x}{\text{MMBtu}} \right) \left(\frac{0.14 \text{ MMBtu}}{\text{gal \#2}} \right)$$

$$0.02594 = \left(\frac{0.1853 \text{ lb NO}_x}{\text{MMBtu}} \right) \left(\frac{0.14 \text{ MMBtu}}{\text{gallon of \#2 fuel}} \right) (\text{manufacturer data})$$

$$0.0000359 = \frac{35.9 \text{ lb NO}_x}{\text{MMscf of natural gas}} (\text{manufacturer data})$$

CO:

$$AD_{CO} + \frac{[(0.0098)(y)] + [(0.00003725)(z)]}{2000} \leq 99.99 \text{ tons/year}$$

Where:

AD_{CO} = annual quantity (tons) of CO from the operation of all diesel generators = sum of [(total hours of operation) × (lb/hr limit)]/2000 for each unit

y = annual quantity of #2 oil combusted (gallons) in total facility

z = annual quantity of natural gas combusted (cubic feet) in total facility

$$0.0098 = 9.8 \text{ lb CO per 1000 gallons \#2 fuel oil (manufacturer data)}$$

$$0.00003725 = 37.25 \text{ lb CO per MMscf natural gas (manufacturer data)}$$

VOC from fuel burning sources:

$$AD_{VOC} + \frac{[(0.0042)(y)] + [(0.00001632)(z)]}{2000} \leq 99.99 \text{ tons/year}$$

Where:

AD_{VOC} = annual quantity (tons) of VOC from the operation of all diesel generators = sum of [(total hours of operation) × (lb/hr limit)]/2000 for each unit

y = annual quantity of #2 oil combusted (gallons) in total facility

z = annual quantity of natural gas combusted (cubic feet) in total facility

$$0.0042 = 4.2 \text{ lb VOC per 1000 gallons \#2 fuel oil (manufacturer data)}$$

$$0.00001632 = 16.32 \text{ lb VOC per MMscf natural gas (manufacturer data)}$$

- (24) National Semiconductor shall notify the Department within 48 hours and submit a report to the Department on a quarterly basis if a malfunction or breakdown in any component causes a violation of any emission standard (Title 38 MRSA §605-C).

(25) **A. Annual Emission Statement**

In accordance with MEDEP Chapter 137, the licensee shall annually report by September 1, to the Department, the information necessary to accurately update the State's emission inventory by means of:

- 1) A computer program and accompanying instructions supplied by the Department;
- or
- 2) A written emission statement containing the information required in MEDEP Chapter 137.

Reports and questions should be directed to:

Attn: Criteria Emission Inventory Coordinator
Maine DEP
Bureau of Air Quality
17 State House Station
Augusta, ME 04333-0017
Phone: (207) 287-2437

B. Biennial Emission Statement

In accordance with MEDEP Chapter 137, the licensee shall report September 1, every two years (2002, 2004, etc.) to the Department, the information necessary to accurately update the State's toxic air pollutants emission inventory by means of a written emission statement containing the information required in MEDEP Chapter 137.

Reports and questions on the Air Toxics emissions inventory portion should be directed to:

Attn: Toxics Inventory Coordinator
Maine DEP
Bureau of Air Quality
17 State House Station
Augusta, ME 04333-0017
Phone: (207) 287-2437

- (26) National Semiconductor shall pay the annual air emission license fee within 30 days of **June 30th** of each year. Pursuant to 38 MRSA §353-A, failure to pay this annual fee in the stated timeframe is sufficient grounds for revocation of the license under 38 MRSA §341-D, subsection 3.

National Semiconductor Corp.
Cumberland County
South Portland, Maine
A-698-71-L-R

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Departmental
Finding of Fact and Order
Air Emission License

(27) The term of this order shall be for five (5) years from the signature date below.

DONE AND DATED IN AUGUSTA, MAINE THIS DAY OF 2003.

DEPARTMENT OF ENVIRONMENTAL PROTECTION

BY: _____
DAWN R. GALLAGHER, COMMISSIONER

PLEASE NOTE ATTACHED SHEET FOR GUIDANCE ON APPEAL PROCEDURES

Date of initial receipt of application: May 20, 2002

Date of application acceptance: October 31, 2002

Date filed with Board of Environmental Protection: _____

This order prepared by Mark E. Roberts, Bureau of Air Quality